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SIR-C ANTENNA PATTERN PREDICTION, HEALTH CHECK, AND  
VERIFICATION

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The SIR-C antennae are dual frequency (L- and C-bands) and dual polarized (H- and V-polarizations) phased arrays. Each array is composed of 18 panels. In order to predict the antenna pattern, all panels were tested using a near field probe. Differential phases related to all phase shifters were also measured to simulate the electronically steered antenna beams. The near field probe and the required probe calibration technique will be discussed.

Since each antenna has BITE (Built In Test Equipment) structures, the health of all T/R modules can be checked in a relatively simple manner. First, we measured the phase and amplitude responses of each T/R module before the SIR-C/X-SAR mission to establish a baseline BITE data set. The BITE data obtained during the mission is then compared with the baseline data to check the health of all T/R modules and phase shifters. Examples of detecting failed elements will be presented.

The predicted antenna pattern was synthesized from the near fields of all panels. Since this method ignores mutual couplings and the error due to the near field probe technique, external verification of the pattern becomes useful. In order to verify the accuracy of the predicted patterns, we used various techniques to extract the antenna patterns using the ground equipment such as ground receivers and tone generators. The antenna pattern can be estimated from a SAR image of homogeneous scattering objects. The predicted and measured patterns will be compared using several examples.